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ABSTRACT

This document deals with the initial technological training of professionals in the information services at three levels: the main professional level, the higher professional or managerial level, and the paraprofessional level. In addition to a review of some general considerations, the paper provides more detailed discussions of technological and organizational considerations. Technologies covered include reprography, word processing, computing, telecommunications, databases, and data storage technology, with sections on course elements, electives and career choices, and levels of instruction. Organizational considerations include the status of training schools and infrastructure requirements; validation of courses, including the role of professional associations, a common training system, and the questions of training abroad; technological equipment in training schools; and a pedagogy for technical training. A summary and conclusions, notes and references, and an 82-item bibliography are included. (THC)

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INTERNATIONAL SYMPOSIUM ON HARMONIZATION OF EDUCATION AND TRAINING PROGRAMMES IN INFORMATION SCIENCE, LIBRARIANSHIP AND ARCHIVAL STUDIES

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THE TEACHING OF TECHNOLOGY AS A SUBJECT FOR THE PREPARATION OF LIBRARIANS, DOCUMENTALISTS, ARCHIVISTS AND OTHER INFORMATION SPECIALISTS

by M. COOK

General Information Programme and UNISIST

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THE TEACHING OF TECHNOLOGY AS A SUBJECT FOR THE PREPARATION OF LIBRARIANS, DOCUMENTALISTS, ARCHIVISTS AND OTHER INFORMATION SPECIALISTS

GENERAL CONSIDERATIONS

1. The present study is concerned with the initial formation of professionals in the information services. It does not deal with the training of specialists or technicians for whom information technology (IT) will constitute the main area of work.

2. There are three levels at which initial training in the broad professional areas are offered: the main professional level, the higher professional or managerial level, and the para-professional level. The differing traditions and situations of countries and regions mean that from nation to nation personnel at these levels have different conditions of service, and their

training, functions and status are interpreted in different ways. Despite this, some generalisations have been attempted (4). In these, there is sometimes an assumption that professional staffs (information scientists, librarians, archivists) are recruited from people who have either received specific vocational training after the completion of a university degree in a relevant subject; or have completed a degree course which includes specific training and in its totality equals the former option (5). The managerial level may not have specific entry channels, but would be equated with higher academic achievement (possibly equivalent to a doctorate) and would include training in management sciences. The paraprofessional level is probably set to provide entry to those who have completed secondary schooling to the norms of the country, and then have had a training which will fit them to carry out the processes involved in professional information work, under the general direction of professionals.

3. There should generally be provision for upward movement through these levels by those who prove to be competent, and specialist or technical training can sometimes be a useful way to facilitate this. Continuing education and in some cases retraining may also be an element in the training system. It is clear that there will always be scope for further or more advanced training, or retraining, in technology.

4. Professional preparation and questions of manpower recruitment generally should form part of the planning of a national information system. It is in this context that decisions should be made about the relative importance to be given to technology, and the balance between general professionals and technical specialists. The development of highly specialised technology-based information services demands considerable investment at national level, including investment in technical training. However in the conditions of today, it is a safe assumption that all information professionals should be able to understand the principles of relevant technology and technological information services, should be able to advise their authorities on them, and should be able to undertake the management of certain technical processes.

5. It is in the field of technology that the gap between the developed and the developing nations is at its widest. The rapid pace of development of new technology and new refinements of existing technology, together with the cost of these innovations, is increasing this gap constantly. A survey of education for librarianship in the USA (6) in 1977 showed that 54 library schools were teaching technological aspects under 5 different subject labels: library automation, information retrieval, systems analysis, integrative computer systems (on-line networks) and programming. This may be contrasted with the situation at the time in two of the leading library schools in Africa, where technological subjects were limited to theoretical discussion in one course (7). The scene has developed considerably in the USA since 1977, whereas in Africa there has as yet been little change. In some countries the feasibility of introducing new technologically-based information services has actually decreased

in recent years.

6. The dilemma therefore is this: should we accept the practicalities of the present day and propose different standards for information workers in areas of low and high technology? Or should we attempt to promote at least a minimum general standard which will provide a world-wide basis of agreement and common interest among information workers? A leading characteristic of IT is that it is introducing faster, more accurate and more usable information services over larger geographical areas. It would seem that to accept different standards would be to build in an obstacle to the full development of these services. It would also perpetuate problems of low status which already bedevil the information professionals of the third world. The answer might therefore be to opt for a single minimum standard of basic knowledge and competence. All information training could then seek to provide at least this standard. It could serve as a basis for further and more specialised training in suitable cases. Advanced technological work will doubtless continue where there are suitable conditions for it. It is perhaps worth adding that training institutes which have not adopted a considered technological programme are not confined to developing countries.

7. We must recognise that the rapid development of new technology can mean that new career specialisms are constantly being offered to professionals, at least in the developed countries. Curricula for training schools may provide for these specialisms in the form of electives. There will evidently be a continuing need for training assistance from schools in technologically advanced countries, in many of these electives, for many years to come.

8. Many of these training electives and the career choices which follow from them involve a choice between areas of work which involve widely differing attitudes and objectives. There is a great contrast between, for example, a community librarian in a less developed country (concentrating on literacy and the provision of useful local knowledge) and a documentalist working with international on-line data bases or videotex. Both are contributing actively to the good administration and development of their countries. Both belong to the universe of information professionals of their country and of the world. Their education should be designed so as to reinforce the sense of belonging to this universe, and the ability to make a contribution to the development and extension of professional standards in it.

9. The three main branches of the information profession are also each at the present moment caught up in the changes brought about by rapid technological development. Information scientists and documentalists are affected by the constant appearance of new data base systems, new methods of communication and new computer facilities. Librarians have to consider the effect of new book production and distribution systems, and the effect of central services and library management systems. Archivists must deal with the new area of data archives and the management of machine-

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readable records, as well as with the advent of computers as aids to the management of their service. All branches are concerned with the education, support and extension of user groups, and the subject specialities of those groups. All must develop their professional expertise within a context of financial cutbacks and economic recession.

10. These changes and this situation should provide a setting in which harmonization between the professional groups becomes more important and more feasible. Since each must cope with the effects of increasing technology, we may come to accept that the differences between them are less fundamental than some have claimed (8). From the point of view of a planned information system, one can see that the basic principle behind the division between the three groups is that their working material comes into the system from different sources. Archives enter the information system by being generated within the organisation; books and serials enter it by purchase; documentation comes in by selective acquisition through data bases. Once the appropriate media are in the system, technology can provide mutually intelligible systems for processing and use of the data, and for the provision of effective user services.

AREAS OF TECHNOLOGY

11. Scanning curriculum guidelines (9) suggests that for the purposes of this study, there are two separate areas of technology which should be treated. These are (i) reprography and (ii) IT based upon computers and communications. A third technological area - preservation - will be reserved for separate treatment elsewhere.

12. At first sight, reprography and IT stand in regard to each other as medium technology to high technology. Each contains possibilities for being operated at varying technological levels, and the levels required should be taken into account in constructing training courses. Both areas demand practical as well as theoretical training, and should therefore be taught in the presence of usable technical equipment, hardware and software.

REPROGRAPHY

13. Ideally, all information professionals should be acquainted with the general principles of reprography, should understand its aims and uses, the use of the most common types of equipment, the storage of the materials and the best means of retrieving information from them. Each of the professional groups has a distinct area of interest: for librarians this could be publication and book production/distribution in microform; for documentalists it

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might be the transmission of documents and finding aids in microform; for archivists the management of records generated by microform administrative systems. Other aspects, constituting the common core of reprographic practice, remain in common between the groups. It is therefore possible to recommend that a course in reprography might be planned and taught entirely in common. A course of this type might, in its general curriculum, ignore the special interests of each group, but it could contain discussion and analysis of those interests during the course of teaching.

14. The broad fields to be included are as follows.

. Administrative reprographics.
Photocopying and xerography; production and distribution of reproduced information media within an organisation.

. Microreprographics.
Microforms as administrative systems; for security or preservation; in reference services; as publication; for transmission or acquisition of information/documents.

Planning and costing microform programmes; selection and preparation of materials; processing materials through the system; checking and storing microforms which result; retrieval of information from microforms; maintenance of reading equipment and user services; maintenance of processing equipment and consumables; evaluation of the service. A knowledge of international standards is required.

Principal formats and processes; sources of updated knowledge and technical advice from specialist centres; conservation of materials.

. Publishing reprographics.
Principal formats and processes: offset litho, multiple xerography, physical typesetting (if relevant), computer typesetting.

Planning, costing and evaluating publication programmes. This aspect could be co-ordinated with user studies.

15. Levels of instruction

(a) Professional: training could concentrate on the skills and information required to plan, cost, manage and evaluate a system. Detailed technical knowledge of the hardware, consumables, processes and product is needed for this, but the orientation of the course might properly be towards management of men and materials within a planned programme with objectives and provision for testing and evaluation.

(b) Managerial: a common assumption is that senior management will normally be drawn from those experienced in professional life. The extra skills required will therefore be either in the direction of advanced management techniques (such as personnel selection and control; systems analysis; or budgeting

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within the context of the whole institution) or in the direction of technological specialisms. Courses could therefore aim at each of these.

Courses in advanced technology are possible in any of the above areas, as are updating or recycling courses.

(c) Paraprofessional: training might concentrate on the operation of specific processes and systems. Although instruction ought normally to be practically-based, students should understand the purpose and methods of the overall system, and the broad principles behind the operation of the technology; they should have a clear knowledge of the standards to be applied, and how to test them.

Investment in hardware

16. For these aspects of technology it is probably not necessary for the training institute to invest expensively in equipment for teaching purposes, unless this equipment can also be used for active operational programmes associated with the work of the school. For example, a printing unit is often a useful support for research or development work in documentation, library or archive projects. In other circumstances, it is probably sufficient that students may be able to observe operational installations, and preferably do a short practical there.

INFORMATION TECHNOLOGY

17. The problem here is to devise a common course which will bring students to an understanding of all the main applications, which will remain practically-based, and which will serve as the basis from which later specialisms can be developed. An associated problem is that some aspects of IT are intimately associated with areas of professional activity specific to the different professional groups. Thus text and information retrieval programmes deeply affect data standards and structure for archival description; central cataloguing and MARC standards have transformed cataloguing as an in-house library activity; and access to on-line data bases affect the services offered by documentalists. The effects of technology on these areas of professional activity must be allowed for in teaching these subjects (description, cataloguing, information retrieval, user services, etc). It follows that technological subjects which are to be taught in common should not be left without contact with the relevant specific professional courses. The central technology course should not, in other words, be left entirely to a specialist professor who will treat the subject in isolation. Some way should be found of considering the effects of technology through every other aspect of professional work. Schools of information training might adopt a staffing structure which can

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promote constant re-evaluation of course content and the relationships between courses.

18. The following is a summary of the principal areas which could be covered in a common course. Training should as far as possible have a practical bias: it should involve each student with hands-on project work. If this is not possible, at least a systematic programme of visits to working installations, with follow-up seminars, is the minimum.

Word-processing

19. This term covers a range of automated techniques in administration, often including the administration of the information service itself. The subject could be divided into two distinct sectors, covering the effect of automation on all administration and its effect specifically on information services.

(i) In general administration, the production and updating of information-bearing media. Methods of recording information on disc rather than on paper lead to consideration of paperless office systems and communications, teleconferencing and the disposition of staff.

(ii) In information administration, these processes are relevant to acquisitions control, catalogue/finding aid production, abstracting/indexing and the dissemination of output, storage and editing of search results, and perhaps circulation control methods.

Computing.

20. Computer appreciation, as an introductory module, could cover the general principles, concepts and terminology of computing as they affect professionals who will work with computer installations. This might include some acquaintance with the main forms of hardware, mainframe, mini- and microcomputers; and with some of the most relevant software packages. It would be appropriate if students were able to carry out simple standard procedures with the keyboard (such as logging-on, displaying directory, using operating systems to create, edit and search files), and see (and if possible use) visual and intelligent terminals in operation.

21. It is worth noting that even in situations where practical teaching is not feasible, it is possible to devise and run a course aimed at developing 'pre-computer skills'. This could concentrate on the analysis of work flows, setting out processes with the aid of flow-charts and decision plans, and drawing up a scheme of technically accurate objectives and system requirements. Such a course could be of great value even in the entire absence of computer systems; but it must be admitted that it gains enormously in credibility and relevance if it can be taught on a practical basis. In any case, in the absence of the actual hardware this type of course might more naturally form part of

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the professional sections of the curriculum.

22. A more detailed examination of working computer systems in the information field could follow. This might be an analysis, including practicum if possible, of either (a) a relevant software package, such as a bibliographical or data base management system, or (b) an operational system for control of information processes: circulation/readership control; ordering/acquisitions; finding aid production; information storage and retrieval. Knowledge of the physical format of computerised records (magnetic disc or tape, optical disc, COM, etc), its storage and handling, might be said to be necessary to all information professionals, and so, probably, are the principles behind the appraisal and archiving of machine-readable data, accessing it, and its place in the information environment. Knowledge of international standards and widely used networks/systems is probably also necessary (e.g. MARC formats, REFLES, OCLC, SPINDEX: but the choice of the most relevant among a very large and growing number of systems which are technical aids to professionals must be left to the schools themselves).

23. The question as to whether an agreed minimum course in IT should include practical instruction in programming is a debatable one. Many information schools in the developed world do include it, and proponents would argue that such a course would provide invaluable intellectual skills, even where those skills were not immediately applicable. Many schools do not attempt programming, however, and would no doubt point out that there are considerable constraints of time and resources. It would certainly be inadvisable to advocate a programming course in situations where computers remain remote from the students' experience - where, for instance, it is not reasonable to hope that students might acquire a cheap personal microcomputer. At the present time it would seem likely that programming should not form part of a general course, but that the concepts that underlie it should remain in the computer appreciation element.

Telecommunications.

24. Less developed countries will probably find this the least relevant of the fields presented, and it may be that for the time being this should remain an optional elective. In countries where the telephone service is unreliable and thinly distributed, where television receivers are rarely held by more than a tiny minority of individuals, and the electricity supply is limited and unreliable, the development of information services through electronic outlets will be slow; where microcomputers acting through television networks are also involved, the matter will remain largely theoretical. But telecommunications networks are taking shape very rapidly in developed countries, and are even beginning to penetrate successfully into individual homes. It is clear that there would be dangers in omitting knowledge of them from the training of professionals even in the least developed countries.

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25. Even so, there is a very wide range of technologies involved. This runs from microcomputer networks within organisations, or among specialist groups (such as the TORCH network), to transmissions of data by way of earth-orbiting satellites. The uses to which this range of technology can be put also cover a wide range: searching catalogues or data bases, the transmission of document facsimiles, SDI. Videotex and teletext services are developing fast in many countries and in the international scene, following the fast development of communications technologies. The implications of these developments are so far-reaching that all the information professions should probably receive at least some training in them. Information scientists are the group most accustomed to using advanced telecommunications at present, but library networks are also increasingly common. Archivists have so far taken the view that remote on-line access is not a high priority for their systems (10), but with the growth of planned information systems and of current records management in the private sector, this attitude will probably change. The speed of development of technological systems and of new technologies, and the consequent drop in the cost of using them, is another factor which will alter traditional attitudes.

Data bases

26. Although conceptually and technologically linked to telecommunications, on-line data bases should perhaps be treated as a separate subject, since they already exist in large numbers and are on offer to information services all over the world. Many information services are in the process of setting up new data bases to cover their specialist areas, and there is considerable interest in the creation of local data bases (11). It has been estimated that the number of data bases which can be accessed by participants grows annually by 30%(12). Once again we encounter a situation in which the less developed countries, especially where these countries are particularly short of hard currency reserves, are being left behind. Nevertheless information practitioners in these countries have a need as great as the need of their colleagues in more developed areas, to understand what is on offer and how it may be developed or utilised for their own national development. Local data bases offer the possibility of a particularly suitable component for this. It is hard to imagine a planned national information system of today which does not make provision (at least in principle) for access to certain on-line data bases (for instance in medicine or in agricultural chemistry) and for the development of some local ones. Trained manpower is an absolute necessity for such developments, and the training covers an area of expertise which ought, in general, to be present in the whole community of information workers.

27. The minimum content of a training course, which ought as far as possible to contain a strong practical element, might be

as follows:

(a) Knowledge of the use of a command language in connexion with an established on-line data base. This may involve the student in working across a language barrier, which has implications in other parts of the curriculum (13).

(b) Some practice in the use of a data base management system (this may be co-ordinated with teaching in connexion with the general computing course, above).

(c) A study of the main existing bibliographic and abstracting data bases; in some cases full text data bases may be valuable.

(d) Some acquaintance with the design and use of local data bases.

Data storage technology

28. All information professionals, and not only archivists, may need to understand the physical and system requirements for the various data storage media, particularly magnetic tape but also hard and soft discs, digital discs and optical discs. Instruction could include surveying, appraising and documenting the material: in many cases this is no longer an area which can be left entirely to archival management.

Electives and career choices

29. The curriculum elements briefly noted above are an attempt to sketch the outlines of a common training in IT, which might be appropriate to the initial training of all branches of the information professions. A training like this would amount to a very considerable requirement, exceeding by far the amount of technical instruction available in many established schools of the third world, and even in some elsewhere. The rapidity of technological change, however, and its ability to spill across borders, make it necessary to provide for the professionals of the near future, and the kind of service they will be expected to offer.

30. Beyond the central core of information workers in established institutions such as the national library, archives or documentation centre, there may actually or ultimately be several groups of information workers who wish to take on careers which face outwards in different directions. These will include:

(a) Staff working with the local community, in public libraries, community information centres, local archives. High technology in this field will be slow to spread, especially in those parts of the world where an artificial physical environment (such as reliable airconditioning) is needed for electronic equipment. Even so, it is worth noting that there are already electronically based systems which are aimed at this market (e.g. the Community Memory Project at San Francisco)(14). Materials involved are

likely to be books, serials, newspapers, audio-visual materials, orally-transmitted information, documentary and other records, information about places, events and artefacts.

(b) Those who choose to serve local communities through school librarianship. This group is more likely to be drawn into specialist networks, national or international across language regions. Visual and audio material archives and orally-transmitted materials will be involved as well as books and access to data bases.

(c) Those who serve academic communities or invisible scientific colleges. This group includes documentalists, special librarians and scientific archivists. This environment is already likely to contain technologically-based services, and to have an awareness of their importance. It would be valuable to build into this aspect of their training a sense of the importance of records management, and with this the arguments for integrated information services within the organisation. Information professionals who manage documentation centres or special libraries within organisations (for example, in Ministries) should be able to liaise closely with those managing records systems under the national archives service. In some circumstances, collaboration in technological systems could provide the basis for this liaison.

(d) Those who serve large administrative units, whether in central or provincial government or in the management of specialist or commercial organisations. This group could include many established career opportunities in all three branches, such as staff of national and other large library services, documentation centres and archives. Their exposure to automated systems will vary, but in general many of them may expect to become exposed to them quite soon. This may occur through adoption of a specialist data base by the documentalists in a technical field; the introduction of microcomputers in the management of a large service; or the introduction of a system for information retrieval in supplementation of manual finding aids. This group probably contains most of those who will be called upon to represent the interests of their colleagues and of the information services, in planning discussions with government or funding agencies. They will also be those who represent their country in professional forums overseas or in international meetings. It is important that they should find themselves equipped to speak competently and to plan and manage efficiently, using the concepts and terminology of modern information science.

(e) Teachers of information subjects. Even where these subjects are not directly included under the heading of technology, they are likely to be deeply affected by the advent anywhere in the world of automated systems. Classification and cataloguing of books, arrangement and description of archives, abstracting and indexing, and the management of organisations are all examples of subjects traditional to the training of information specialists which have been so transformed. Personnel in

this category are likely to be among the senior or more experienced of the information community, but they will need access to updating and recycling courses, and there ought to be means of keeping them in contact with developments in other parts of the world.

(f) There may well be further career choices which may need elective courses at some level. These might include, for example, design and development of informationsystems (systems analysis, equipment and software selection, etc.).

Levels of instruction

31. Both common core technology and such electives as are provided should be planned at appropriate levels. These may be summarised as follows.

32. Professional entry. Though the course should be practically-based, the main objective might be to provide staff who can analyse existing systems, generate statements of their professional requirements, liaise with specialists in designing new systems, and then evaluate and maintain them. In the practical project it is a good idea to require the student to input data himself, so that he can understand what is involved in data capture processes; but it might be part of the project that he should design the necessary documents and so be able to supervise clerical or paraprofessional staff who will be responsible, later on, for the management of data processing under the scheme. It is evident that close access to computing facilities is needed. Generally, this is best provided in the context of a university computing service, where technical staff are expected to teach, and where the teaching function is regarded as one which should be funded by the institution.

33. Difficulties of access to computers include the need to have the proper number of terminals and the provision of lecture rooms with display facilities. These would often be provided by a university infrastructure. Otherwise, computer requirements are not great. Information workers do not always need much sophistication from their computer services: they need considerable storage space for data files, but nowadays this is not usually a difficulty. The actual computer operations required - entry and editing of files, sorting on fields, searching for keyword strings, construction of indexes and some flexibility in determining output layouts - are all standard in most computer systems, and are often provided in the operating system or common packages compatible with it.

34. Falling costs and greater storage capacity make microcomputers an attractive possibility for this kind of training, and this may be an option where the training school does not have access to university computing services, especially since these machines do not need such a carefully controlled environment.

Organisational considerations

Status of information training schools and infrastructure requirements

35. As noticed above, all information training should take place within the general context of a planned national information system. This generalisation naturally applies to technological training within this broader field, but since in this case much greater inputs are required by the funding and controlling agencies, the argument that there should be planned national activity is stronger than with training staff for manual information services. There is perhaps a case for treating the education of professionals in IT as a special category, even where there is little or no central co-ordination of information training in the traditional fields. Central planning for the development of technologically-based information services makes sense nationally and ought to include provision for training.

36. Porat and Rubin's analysis of the American economy (15) into four sectors, of which information is one, provides an interesting illustration of the importance of investment in information training and in assisting the technological development of information services. According to this analysis, such a large proportion of the national resources (admittedly in a highly industrialised society) is devoted to or dependent on information services, that it was concluded, as long ago as 1967, that "the American economy is an information economy". It may be assumed that the development of similar services elsewhere is desirable and probably inevitable.

37. Viewed in this light, it would be natural to expect that the planning agency would also be responsible for financing the technology needed to provide training in this aspect. It has already been pointed out that a certain amount of infrastructure is necessary to provide the facilities for teaching IT. These facilities, in broad terms, are not particularly exacting, and are not likely to be as expensive or as elaborate as comparable facilities in the natural sciences, or indeed in the wider information networks themselves. They may be summarised as follows:

(i) Access to computing services via on-line terminals, off-line batch processing systems, or microcomputers. This should if possible be adequate to allow each student to construct and carry through a practical project.

(ii) Software. This might include easy access to a standard information (bibliographic, text management, data base management or information retrieval) system, on which the student's project can be based. Simulation packages and instructional packages might be added.

(iii) Data storage, up to an agreed capacity. Student work in the information sector involves larger data storage capacity

than student work in, for example, mathematics. However the total capacity needed is much less than would be required for an operational information system. Sufficient space is needed to allow students to sort their data by fields, or to output a KWIC index of a narrative text field; floppy or hard discs on micro-computers, for example, would generally be sufficient.

(iv) Access to expertise, and to technical support services. If standard software is to be adapted to the school's computer, programming support will be needed. Similarly, staff who are capable of solving technical problems in computer manipulation, and who can work with technicians or other specialists in maintaining the system, must be available at least during the introductory parts of the course. This generally means that the school will be using facilities at a larger configuration, such as a university computing service.

(v) Access to standard peripherals, including line printers.

Validation of courses

38. The information services, worldwide, tend to suffer from the relatively low status of their workers. In some countries this is a major obstacle to the development of those services. In part, this is a problem which can only be tackled by central authorities, who decide on job levels and conditions of service. In part, it is a question of whether there is a satisfactory basis of legislation. An important factor is the validation accorded to training courses in the information professions. These courses must be perceived, both by the general public and by the academic community, as being fully up to standard by any criteria which may be applied by academic institutions. This consideration is one of the most important arguments for the inclusion of information training in the university network.

39. The professional associations have in many cases an important role to play in this question of validation of courses. In many countries, there is a formal procedure for the recognition of courses, which may sometimes by backed by legislative powers. Such an arrangement may not always be desirable, especially if the professional association is not well organised and has no specialist staff; nor is it always possible to establish it. Even where there is no formal support from public or academic authorities, however, there is still a possible role for the professional association in studying the provision of training facilities in its country or region, and making proposals for its improvement. Technology is a particularly suitable area for this intervention, for by its nature the introduction of technological training must be innovative, and must be based on the experience of information professionals.

40. Finally, training in professional subjects often demands making use of the experience of professional workers in post, by

recruiting them as part-time teachers, or by using them to supervise practicals. Here again there is an important role for the professional associations.

41. In most cases, even where the professional associations are well organised and take a full part in the design, conduct and validation of courses, the most important single factor is the approval of the academic community, embodied in the universities. The academic and professional respectability of information training is vital. This means that entrants to careers in the information professions must be well educated in academic terms, i.e. they must be graduates. This raises the problem of the paraprofessionals and the courses which train entrants to these necessary lower levels. Relatively large numbers of paraprofessionals are usually needed, and without them it is not possible to maintain information services, however well planned and managed they may be.

42. The growing importance of IT has underlined that there is a special problem in connexion with the training of paraprofessionals. These essential workers also need training that is soundly based academically, though more practically oriented; and they need training which associates them with the general work of the information professionals, and makes them feel part of the whole enterprise.

43. Paraprofessionals need a procedure which would provide a satisfactory career structure, including the possibility for some to rise into the ranks of the professionals. Such a career structure should not dilute the graduate status of the professions generally, so that it must provide for advanced study over extended periods. IT offers a case where this kind of promotion over the professional barriers might be particularly suitable. Paraprofessionals who show a particular aptitude for some aspect of technological work can, if given suitable backing and proper educational facilities, become specialist experts.

44. The question of bringing the various branches of information work together into a common training system - the objective of harmonization - remains to be considered. The whole thrust of the present paper, of course, is towards the treatment of IT as a common, harmonizing, influence. This could be achieved, in the more developed countries, without actually amalgamating the different training schools or courses. There are three possibilities:

(a) keeping the training schools separate from each other, but co-ordinating their teaching of technological subjects;
(b) keeping the training schools separate from each other, but teaching technological subjects in a central technological department or institute;
(c) amalgamating the training schools into a single department.

An argument could be made for each of these options in the circumstances of particular countries or regions. Technology has a particular importance in resolving this question. The investment

in hardware, personnel and training which is involved in the development of modern IT and technologically-based services is such that a training institute which deals with them must be more advanced scientifically and must be significantly better endowed financially than one which deals only with manual professional processes. If it is technologically equipped and staffed, a training institute is more likely to achieve high status within an academic context.

45. It is clear that there must be special provision for the co-ordination of training in specifically technological areas. This might be done by establishing a structure or association of teachers of IT, which should no doubt be under the wing of the association containing practitioners in the field. Co-ordination cannot be achieved without regular meetings which have some power to influence actual teaching and the content of courses.

46. If there is a case for the close co-ordination of training institutions within a country, there is also a case for international co-ordination, especially within the Regions. There must be a common standard of intelligibility: this particularly applies where new technologies are beginning to influence professional groupings which have largely been untouched by them. All information work, manual or technological, is essentially development work. Professionals in the field should feel that they are engaged in a common enterprise and can meaningfully share experiences or solve common problems with common solutions. The success of information services depends greatly on the attitudes displayed by the staff in their work. The development and maintenance of these attitudes would be an important concern of a regional school, or of a system which spreads shared experiences across national boundaries.

47. It is in this context that training in foreign countries should be considered. Since information is a universally needed resource, each country will wish to develop its own training system; and in the same way, it will be clear that even smaller countries can and should eventually sustain their own training institutions. The smallest countries can and often do enter close regional arrangements, and this is a strategy which can be adopted wherever individual countries do not feel able to establish their own training schools. From this viewpoint, the training of professionals in foreign countries is not desirable: the training they get is not necessarily the most appropriate, and they are divorced from their cultural heritage. On the other hand, the interchange of professionals between countries (which is one effect of training abroad) also has good results. It improves the common intelligibility which ought to exist between information professionals. Applying the problems revealed by this debate to the question of technology points up the importance of the various considerations.

48. The coming of technology has brought new strains to the information training schools. If developing countries have not had the resources to develop traditionally based schools, a

fortiori they do not have the resources to develop technologically-based ones. Here, it might seem, is a case for adopting a policy of training abroad: let the technologists (meaning by this those who are to be trained in advanced or specialised technological work) be trained in more developed societies.

49. Unfortunately this policy brings with it a number of serious problems. The technological gap between the more advanced and the less developed countries is extremely wide. Trainees may well be exposed to inappropriate training, and return to their countries to experience what they may perceive as failure. Technological information services really need to be introduced as whole systems, backed by appropriate public provision; this provision would then include staff training at all levels. This training may be by partial use of teaching facilities abroad, but it should not be piecemeal. If training is co-ordinated, and newly trained professionals brought back to occupy preplanned posts in an orderly development, then training abroad may well be a suitable strategy for a country which is in the early stages of development. Similarly, specialists and consultants from abroad may be of great assistance to a country in bringing forward its development - but only if their services are planned and co-ordinated.

50. There are therefore two related sets of problems: the problems of keeping pace with technological developments at an appropriate level of technology; and the problems of keeping a high degree of mutual intelligibility and fellow-feeling between professionals in manual and in technologically based services. In solving these problems, the role of the professional associations, both national and international, will once again prove of great importance.

Technological equipment in training schools

51. The needs of a training school in terms of access to IT have been discussed above (para. 37). The implications of this access for the organisation of the school should also be considered.

52. The success of training in any aspect of IT depends, of course, on the provision both of instruction and of teaching hardware. Technology should if possible be taught practically, and students should therefore have as free an access to the particular equipment as their course requires. Wherever possible students should be able to devise and carry through a supervised practical project.

53. Since training in technology should match the provision (or planned provision) of appropriate services in the country, the introduction of particular kinds of hardware in the training school might match the introduction of the relevant service nationally. It is important to avoid the error of training

people to run technological services which they then do not meet in their career. Consequently investment in equipping training schools ought not to be unrelated to national investment in the area.

54. Viewed in this light, the cost of equipping the training institution is not in itself necessarily a major investment, since it follows on a smaller scale the national investment in the service.

55. Initial investment in a training school's technology could probably begin with the installation of a microcomputer with word-processing capability. Since it is important that students should have individual access, it is not likely that a single machine will be sufficient for more than a very preliminary period. A next step could be the provision of a classroom of similar, linked machines, so creating a teaching laboratory. This might also have facilities for group teaching. An alternative could be to provide a classroom of interactive terminals linked to a larger computer: but this approach would depend on the central facilities of the university or overall academic authority.

56. In parallel, equipment based on telecommunications might be planned, with television sets using the appropriate text transmissions, and telephone link apparatus. This equipment does not lend itself in the same way to classroom configurations, but could conceivably be used also as the school's on-line link with the national service.

57. Line printers should be available in or near the classroom.

58. As important as the machinery is the software. All aspects of technological teaching are dependent on the existence and usability of suitable programs. This applies all across the spectrum from initial computer appreciation to practice in advanced technical specialisms. To establish software on site some programming skills will be necessary, and indeed teaching staff in the school will presumably have to be able to design, maintain and adapt the software.

A pedagogy for technological training

59. Technological training does not differ from traditional training in the information sciences in one important respect: it must aim to produce self-critical and self-reliant professional operatives. Its orientation should be towards supporting the student in his learning, and developing his ability to solve problems, make decisions and evaluate work done. This orientation is one that is not compatible with authoritarian styles of teaching, or with pedagogical traditions often associated with dictation of notes by the teacher. Student participation in the teaching and learning process should be as active as possible.

60. This principle applies at all three levels of teaching, though of course it ought to be applied appropriately. Technological training is different from training in the traditional subjects, in that there may be a strong emphasis on the imparting of information, and on practical instruction in specific skills. In the training of paraprofessionals, this may lead to a teaching technique which largely consists of direct instructions ("First do this, then do that"). This should be tempered wherever possible by a discussion of underlying principles and by group discussion of those principles, in the light of the aims of the service, and its place in the overall information system.

61. Trainee professionals should give an important portion of their time and effort to learning the theoretical base of their discipline. The precise nature of information science, as a science, is the subject of debate; but in so far as there is a theory in this field, it is necessary for students to be acquainted with it. It is only by understanding this theory that practitioners are able to develop the services, technologies and systems which form part of the information industry of a country. Thus seminars and discussion periods should form part of the timetable of training schools; library resources are as important as hardware configurations; and openness to academic enterprises in the local intellectual community, and to developments abroad is an essential part of the atmosphere of the school.

62. These remarks apply equally to training at advanced or managerial levels, and even more to teaching in the context of continuing education or updating courses given for professionals in post.

63. An open style of teaching throws a great deal of responsibility on the teaching staff. As in traditional information training, the attitudes of the teachers are all-important, and these are determined in large part by their conditions of service. In many countries, even the most advanced, many of the teachers in information courses are professionals in post, giving part of their time. There is much to be said for this system, which utilises the experience of people who have been successful in the practice of their profession. On the other hand, this is a kind of training by apprenticeship, a system which tends to perpetuate questionable practices. More seriously, it is a system which discourages innovation and independent research by the teaching staff. A school of information science ought to be the centre of research, or it will not be able to fulfil its function as one of the centres of development of the information services of the country, nor will it be able to take part in the internationl interchange between information researchers or developers. In the context of technology, this would be an important failure, and one which would have long-term consequences on the development of national information services.

Summary conclusions

64. This paper has attempted to discuss some of the main implications of using the teaching of technology as part of the means of harmonizing the training of documentalists, librarians and archivists. A particular feature of this subject is that it is essentially innovative in all three branches, is subject to rapid, highly technical and expensive development, and impinges on theory and practice in all areas of the traditional curriculum. Some of the particular points and problems raised are summarised as follows.

65. Training in IT should be provided for in a national plan, which should link it with the development of the operational services. This consideration affects the placing of the training school (preferably in a university) and the equipment provided for it.

66. All three levels (professional, managerial and paraprofessional) need training in technology, and in this training the level of instruction is important. However, technology can provide a career channel which can override barriers between professional levels, provided there is proper provision for training, retraining or the development of specialisms.

67? All professional levels need a common standard of knowledge which would allow them to understand the nature of technologically based services. This applies across national and regional boundaries. Technological training therefore is a special case when planning for national or regional schools is carried out. The case for international involvement is likely to remain strong.

68. In IT, the gap between the less and the more developed countries is wide and is growing wider. At the same time, one of the constraints experienced by less developed countries is the lack of experience of their information staff in the practice of IT. Information training should therefore seek to ensure that all information workers understand relevant technological processes: if possible, there should be a basic common training for all. This basic training should be reinforced by a system of updating and continuing education, and by training for some in advanced and specialised forms of technology.

69. In reprographics, training could be entirely in common between the information professions.

70. In electronically-based technology, where the effects of IT extend deeply into professional subjects, it is not so easy to devise an entirely common course, but there could be a common course of instruction in basic principles, and provision for electives.

71. Training in IT should be as practical as possible, with hands-on experience, and teaching methods should be open. There

should be provision for mutual support by teaching staff, and the development of new courses or applications. Both in this and in validation of courses the professional associations could be involved.

72. A persistent problem in the development of information services is the low status of the personnel and of training courses. The introduction of IT should serve to reduce both these problems. The high cost of teaching hardware suggests that training schools should belong to institutions (such as universities) where there are central technological services. Academic respectability is necessary.

73. IT is constantly developing, and in ways that are relevant, or potentially relevant, to all the information professions. This underlines the importance of encouraging national or regional training schools to undertake research as well as sustaining programmes of continuing education. This research depends on the quality of the teaching staff, and their conditions of service.

Notes and references
[Full bibliographical references appear in the bibliography]

1. P Havard-Williams and E G Franz. Planning information manpower UNESCO, 1974.

2. W L Saunders. Guidelines for curriculum development in information studies. UNESCO, 1978.

3. M Cook. Guidelines for curriculum development in records management and the administration of modern archives. UNESCO, 1982.

4. Cook, op.cit., section 5.

5. E G Franz, in Havard-Williams, op.cit, p.45.

6. T Saracevic. 'An essay on the past and future (?) of information science education'. Information Processing and Management 15 (1979), p.13.

7. S I A Kotei. Integration of library, archive and documentation courses. University of Ghana, Department of Library and Archival Studies, 1977.

8. R L Clark, Jr (ed). Archive-Library relations. RR Bowker, 1976.

9. Cook, op.cit., p.54.

10. L J McCrank. Automating the Archives. Knowledge Industry Publications, 1981.

11. UNESCO. Asian Regional Seminar on Local Data Bases and their use, Quezon City, 10-14 October 1983: Final Report. University of the Philippines, Institute of Library Science, 1983. [PGI-83/WS/31].

12. M E Williams (ed). Computer-readable data bases: a directory and data sourcebook. ASIS, 1982.

13. J M Griffiths. 'Main trends in information technology'. UJISLAA 4 (1982), p.234.

14. Griffiths, op.cit., p.231.

15. Cited by T Wight. A discourse on issues: an exploratory study of the implications of information technology for UK libraries and information work manpower planning. ASLIB, 1980, p.26.

BIBLIOGRAPHY

1. Aubrac, R. 'French development co-operation: a scientific and technological information policy.' UNESCO JOURNAL OF INFORMATION SCIENCE, LIBRARIANSHIP AND ARCHIVES ADMINISTRATION, 3 (1981), 217-221.

2. Baark, E. 'Appropriate information technology: a cross-cultural perspective.' UNESCO JOURNAL OF INFORMATION SCIENCE, LIBRARIANSHIP AND ARCHIVES ADMINISTRATION, 4 (1982), 263-268.

3. Barclay, J. 'Education for librarianship, accreditation and standards in Australia at the beginning of the 1980's.' IFLA JOURNAL, 8 (1982), 159-169.

4. Barclay, J. 'In and out of library school.' AUDIOVISUAL LIBRARIAN, 8 (1982), 183-184.

5. Bartle, R. & Cook, M. Computer applications in archives: a survey. University of Liverpool, Archives Unit; British Library Research & Development report 5749, 1983.

6. Benge, R.C. Cultural crisis and libraries in the third world. Clive Bingley, London, 1979.

7. Berner, R.C. Archival theory and practice in the United States: a historical analysis. University of Washington Press, 1983.

8. Bonn, G.S. Library education and training in developing countries. East-West Center Press, Honolulu, Hawaii, 1967.

9. Bottle, R.T. 'Education for information and library work.' ASLIB PROCEEDINGS, 28 (1976), 22-29.

10. Bramley, G. World trends in library education. Clive Bingley, London, 1975.

11. Breton, J. (ed). World guide to library schools and training courses in documentation. Clive Bingley & UNESCO, 2 ed, London & Paris, 1981.

12. Caruso, E. 'Training and retraining of librarians and users.' In Kent, A. & Galvin, T.J. (eds). The on-line revolution in libraries. M. Dekker, New York & Basel, 1978, pp.207-228.

13. Chenhall, R.G. Museum cataloguing in the computer age. American Association for State and Local History, Nashville Tennessee, 1975.

14. Clark, R.L. Jr (ed). Archive-Library relations. R.R.Bowker, New York, 1975.

15. Conant, R.W. The Conant Report: a study of the education

BEST COPY

of librarians. Educational Resources Information Center, Washington, 1983.

16. Conant, R.W. A study of the education of librarians. Massachusetts Institute of Technology, 1980.

17. Cook, M. Guidelines for curriculum development in records management and the administration of modern archives: a RAMP study. UNESCO, Paris, 1982.

18. Cronin, B. The education of library-information professionals: a conflict of objectives? ASLIB Occasional Publication 28, 1982.

19. Debons, A. et al. The information professional: a survey of an emerging field. M. Dekker, New York, 1981.

20. Doulin, C.E. 'Education for the electronic library.' DREXEL LIBRARY QUARTERLY, 17 (1981), 77-90.

21. Dudley, E. 'Curriculum change in the 80's - time for significant developments.' LIBRARY ASSOCIATION RECORD, 83 (1981), 332-334.

22. Evans, F.B. 'Indian archival training and the archival training needs of Asia: some observations.' THE INDIAN ARCHIVES, 30 (1981), 1-14.

23. Eyre, J. LATP (Library Automation Teaching Package). Polytechnic of North London, 1982.

24. Fishbein, M.H. A study of EDP education and training in the information sciences and related curriculum guidelines for archivists. Internation Council on Archives, Automation Committee, Aug 1983.

25. Fouche, B. 'The quest for professional maturity: a progress report.' SOUTH AFRICAN JOURNAL FOR LIBRARIANSHIP AND INFORMATION SCIENCE, 49 (1982), 137-139.

26. German Foundation for International Development. International conference: information training for developing countries under special consideration of teaching and learning material: summary report and recommendations. PROGRIS, Berlin, 1981.

27. Gillespie, P.D. et al. Problems of document delivery for the EURONET user. K.G. Saur, Munich, 1979.

28. Gleaves, E.S. 'Los territorios academicos: la educacion de profesionales de la ciencias de la informacion.' REVISTA INTERAMERICANA DE BIBLIOTECOLOGIA, 1 (1978), 17-24.

29. Griffiths, J.M. 'Main trends in information technology.'

BEST COPY

UNESCO JOURNAL OF INFORMATION SCIENCE, LIBRARIANSHIP AND ARCHIVES ADMINISTRATION, 4 (1982), 230-238.

30. Hauptmann, R. 'Education for librarianship in the developing countries: a radical departure.' LIBRI, 32 (1982), 91-108.

31. Havard-Williams, P. & Franz, E.G. Planning information manpower. Intergovernmental conference on the planning of national documentation, library and archives infrastructures. UNESCO, Paris, 1974.

32. Hickerson, H.T. Archives and manuscripts: an introduction to automated access. Society of American Archivists, Chicago; Basic Manual series, 1981.

33. Kaltwasser, F.G. 'Libraries as information service agencies.' IFLA JOURNAL, 8 (1982), 147-158.

34. Kedrovskij, O. 'The state science and technology information system in the USSR.' UNESCO BULLETIN FOR LIBRARIES, 31 (1977), 86-97.

35. Kent, A. & Galvin, T.J. (eds). The on-line revolution in libraries: proceedings of the 1977 conference in Pittsburgh, Penn. M.Dekker, New York, 1978.

36. Ketelaar, E. Republic of Indonesia: archival training. UNESCO, Paris, 1980.

37. King, D.W., Lancaster, F.W. et al. Telecommunications and libraries: a primer for librarians and information managers. Knowledge Industry Publications, White Plains, New York, 1981.

38. Kofnovec, L. 'Regulations issued by the International System of Scientific and Technical Information.' CESKOSLOVENSKA INFORMATIKA, 23 (1981).

39. Kotei, S.I.A. Integration of library, archive and documentation courses. University of Ghana, Department of Library and Archival Studies, 1977.

40. Kumar, P.S.G. 'Practical training in library and information science.' LUCKNOW LIBRARIAN, 14 (1982), 25-27.

41. Mahon, F.V. 'Perspectives of access to on-line information by the developing countries.' UNESCO JOURNAL OF INFORMATION SCIENCE, LIBRARIANSHIP AND ARCHIVES ADMINISTRATION, 4 (1982), 239-244.

42. Marcum, D. & Boss, R. 'Information technology.' WILSON LIBRARY BULLETIN, 1982, 602-603.

BEST COPY

43. Marthaler, M.P. 'Training requirements for future information workers.' UNESCO BULLETIN FOR LIBRARIES, 28 (1974), 315-320.

44. Martin, S.K. The professional librarian's reader in library automation and technology. Knowledge Industry Publications, White Plains, New York, 1980.

45. Martin, J.J. The practical element in library education: a survey. Queen's University, Belfast, Department of Library and Information Studies, 1979.

46. Mikhailov, A.I. & Gilijarevskij, R.S. An introductory course on informatics/documentation. FID, The Hague, 1971.

47. Molino, E. 'Databases: considerations of relevance to developing countries.' UNESCO JOURNAL OF INFORMATION SCIENCE, LIBRARIANSHIP AND ARCHIVES ADMINISTRATION, 4 (1982), 245-252.

48. Montgomery, M. 'New guidelines developed for library technician programs.' CANADIAN LIBRARY JOURNAL, 39 (1982), 159-162.

49. Mwila, A. 'Library education, with particular emphasis on African priorities.' ZAMBIA LIBRARY ASSOCIATION NEWSLETTER, 3 (1981), 6-8.

50. Neelameghan, A. 'Training in computer applications and on-line search for students of library science: a case study.' UNESCO JOURNAL OF INFORMATION SCIENCE, LIBRARIANSHIP AND ARCHIVES ADMINISTRATION, 5 (1983), 12-22.

51. Neelameghan, A. & Picache, U.G. 'Postgraduate training course for science information specialists in Southeast Asia: case study of co-operation in library and information manpower development.' JOURNAL OF PHILIPPINE LIBRARIANSHIP, 5 (1981), 34-49.

52. Parr, E.A. & Wainwright, E.J. (eds). Curriculum design in librarianship: an international approach. Proceedings of the colloquium on education for librarianship held at the Western Australian Institute of Technology, 28-30 Aug 1973. Perth, 1974.

53. Porat, M.V. The information economy: definition and measurement. Office of Telecommunications, Washington DC, 1977.

54. Roberts, N. & Bull, G. 'Professional education and practice: a survey of past students ... of the Postgraduate School of Librarianship and Information Science, University of Sheffield.' JOURNAL OF

BEST COPY

LIBRARIANSHIP, 15 (1983), 29-46.

55. Roper, M. Democratic Republic of the Sudan: establishment of a technical training centre in archival restoration and reprography. UNESCO, Paris, 1980.

56. Ruus, L.G.M. 'Training of data services professionals: past, present and future.' LIBRARY TRENDS, 1982, 455-465.

57. Salman, L. 'The information needs of the developing countries: analytical case studies.' UNESCO JOURNAL OF INFORMATION SCIENCE, LIBRARIANSHIP AND ARCHIVES ADMINISTRATION, 3 (1981), 241-246.

58. Saracevic, T. 'An essay on the past and future (?) of information science education.' [in 3 parts]. INFORMATION PROCESSING AND MANAGEMENT, 15 (1979), 291-301.

59. Saunders, W.L. Guidelines for curriculum development in information studies. UNESCO, Paris, 1978.

60. Saunders, W.L. 'Professional education, research and development.' In Saunders, W.L. (ed), British Librarianship Today. Library Association, London, 1976, pp.341-361.

61. Seal, A. Automated cataloguing in the UK. Bath University Library, Centre for Catalogue Research; British Library Research & Development Report 5545, 1980.

62. Seidman, A. 'Information science - theory, application and education.' NACHRICHTEN FUER DOKUMENTATION, 32 (1981), 63-68.

63. Spivack, J.F. Careers in information. Knowledge Industry Publications, White Plains, New York, 1982.

64. Taylor, P. New trends in documentation and information. ASLIB, London, 1980.

65. Taylor, P. et al (comps). The education of users of library and information services: an international bibliography, 1926-1976. ASLIB, London, 1979.

66. Tedd, L.A. The teaching of on-line cataloguing and searching and the use of new technology in UK schools of librarianship and information science. British Library Research and Development Report 5616, London, 1979.

67. Theobald, R. 'The future of the librarian.' PUBLIC LIBRARIES, 20 (1981), 74-76.

BEST COPY

68. Thomas, A.R. 'New York's faculty development program in information science.' INFORMATION AND LIBRARY MANAGER, 1 (1981), 84-87.

69. Thompson, J. The end of libraries. Clive Bingley, London, 1982.

70. Uchin, J.J. 'Some theoretical and practical issues in the activities of the Institute for Further Training of Information Workers, Moscow.' CESKOSLOVENSKA INFORMATIKA, 23 (1981), 5-10.

71. UNESCO Intergovernmental conference on the planning of national documentation, library and archives services: Final Report. Paris, 1975.

72. UNESCO. Asian regional seminar on local data bases and their use, Quezon City, 10-14 Oct 1983: final report. University of the Philippines, Institute of Library Science, 1983.

73. UNESCO, General Information Programme. Meeting of experts on the harmonization of archival training programmes, 26-30 Nov 1979: final report. UNESCO, Paris, 1980.

74. UNISIST. Meeting of experts on regional information policy development in South Asia, Colombo, 1974. Meeting paper on NISSAT, a national information system for scientific information in India. UNESCO, UNISIST, 1974.

75. University of British Columbia. Program for Master of Archival Studies. 1982.

76. University of Cordoba. Summary of courses at the school for archivists, 1978-9. Cordoba, Argentina, 1980.

77. University of New South Wales. Curriculum review seminar, 16-17 Jan 1980. School of Librarianship, Sydney, 1980.

78. Vickery, A. 'Librarians and the new technology: the process of continuing education.' IATUL (International Association of Technological University Libraries) PROCEEDINGS, Goteborg, 14 (1982), 63-75.

79. Wenger, K. 'Automation and the library's response.' AUSTRALIAN LIBRARY JOURNAL, 31 (1982), 26-30.

80. Wight, T. A discourse on issues: an exploratory study of the implications of information technology for UK library and information work manpower planning. ASLIB, London, 1980.

BEST COPY

81. Williams, M.E. Computer-readable data bases: a directory and data sourcebook. ASIS, Washington DC, 1982.

82. Zurkowski, P.G. 'The library context and the information context: bridging the theoretical gap.' LIBRARY JOURNAL, 106 (1981), 1381-1384.

BEST COPY